EGU23-1246, updated on 26 Apr 2024
https://doi.org/10.5194/egusphere-egu23-1246
EGU General Assembly 2023


# An ozone mini-hole associated with the record-breaking Australian bushfires 2019-2020: satellite observations and the modelled impact on surface ultraviolet radiation

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The Australian record-breaking bushfires around the turn of the year 2020 generated an unprecedented perturbation of thestratospheric composition through the injection of biomass burning material at relatively high altitudes in the upper-troposphere—lower-stratosphere. Associated with this event, a highly-stable smoke-charged anticyclonic vortex, with horizontal extent as large as about 1000 km, was observed. Due to the solar radiation absorption in this vortex, this structure was observed to rise from the initial ~15 km altitude to altitudes higher than ~35 km [Khaykin et al 2020]. This structure persisted in the stratosphere for about 3 months.

Here we present a detailed analysis of the vertically-resolved ozone fields based on the Infrared Atmospheric Sounding Interferometer (IASI) observations, supported by total column observations at relatively high horizontal resolution with Sentinel 5p TROPOMI (TROPospheric Ozone Monitoring Instrument), associated with the smoke-charged vortex due to the Australian bushfires. A marked ozone mini-hole is found, horizontally and vertically co-located with this smoke structure. The dynamical and/or chemical origin of this ozone mini-hole is briefly discussed. Then, ozone profile information is fed to the LibRadtran/UVSPEC radiative transfer model to estimate the impact of this ozone reduction on surface ultraviolet radiation and the results are critically discussed in terms of the possible impacts on the biosphere

Ref : Khaykin, S., Legras, B., Bucci, S., Sellitto P., Isaksen, L., Tencé, F., Bekki, S., Bourassa, A., Rieger, L., Zawada, D., Jumelet, J., and Godin-Beekmann, S.: The 2019/20 Aus- tralian wildfires generated a persistent smoke-charged vortex rising up to 35km altitude, Commun. Earth Environ. 1, 22, https://doi.org/10.1038/s43247-020-00022-5, 2020.